SIEMENS

SIOS

SP

System

Maintenance Instructions

55 37 027

Maintenance protocol SPR1-130.832.11.01.02
belongs to this manual

© Siemens AG 2002
The reproduction, transmission, or use of this document or its contents is not permitted without express written authority. Offenders will be liable for damages. All rights, including rights created by patent grant or registration of a utility model or design, are reserved.

English
Print Number: SPR1-130.831.11.01.02
Doc. Gen. Date: 08.02
Replaces: n.a.

Chapter	Page	Rev.
all	all	01

Document Status

The document corresponds to the status current at the time of device delivery.

The paper copy is an uncontrolled document.

Up-to-date documentation can be ordered from your local Siemens office.

Exclusion of Liability

Installation and Service of the device described herein must be performed by qualified personnel employed or authorized by Siemens or one of its affiliated companies.

Installation technicians and other personnel not employed by Siemens or the technical service department of one of its affiliated companies are directed to contact the local Siemens office or that of the affiliated company prior to performing any installation or service activities.

Page

1 Definitions and Abbreviations 1 - 1

Abbreviations . . . 1 - 1
Definitions . . . 1 - 3

2 General Information 2 - 1

Manufacturer's Information . . . 2 - 1
Time and Personnel Required . . . 2 - 1
Maintenance Intervals . . . 2 - 1
Information Regarding Maintenance . . . 2 - 1
Required Tools, Measurement Devices, and Auxiliary Materials . . . 2 - 1
Required Documentation . . . 2 - 2
Spare parts that may be required . . . 2 - 2
Clarification of symbols . . . 2 - 3
Safety Information and Protective Measures . . . 2 - 4
Product-Specific Safety Measures . . . 2 - 5

3 System Overview 3 - 1

Component positions inside the documentation unit . . . 3 - 3
Component positions inside the central control unit . . . 3 - 4
SIOS PC connections . . . 3 - 6
Component positions inside the device box . . . 3 - 8
Device box - functional components . . . 3 - 9
Supply to device box . . . 3 - 11
Component positions in the monitor unit . . . 3 - 12
Hand input device (HBT) . . . 3 - 13
Keyboard . . . 3 - 13
Modem . . . 3 - 15

4 Preliminary Steps 4 - 1

Preliminary Actions . . . 4 - 1

5 SIOS System 5 - 1

6 Electronics Cabinet 6 - 1

7 Display Unit 7 - 1

8 Device Box 8 - 1

9 Safety Tests 9 - 1

10 Concluding Steps 10 - 1

11 Changes since the Previous Version 11 - 1

This page intentionally left blank.

1 Definitions and Abbreviations

1.1 Abbreviations

AAM	Audio Amplifier Module
AE	Receipt of order
BM / VM	Image mixer / video mixer
CAI	Control Audio Interface
CANopen	Communication bus / control interface for external technologies
C-arm	Mobile X-ray system
CG	Surgical gases
CHARM	Change request management system
CMT	Configuration Management Tool
CO_2	Carbon dioxide
CSE	Customer Service Engineer
CS PS	Internal department code (Customer Services Product Support)
DB	Device Box for housing surgical devices
DE	Documentation unit, upper section of cabinet
DIN	German industry standard
DL catalog	Service provider catalog
DU	Display Unit (central image and control unit)
EN	European standard
Endo	Endoscopy
ES	Electronics cabinet, central SIOS control
ES1 / ES2	230 V multipoint connector
HBT	Hand input device
RF	Radio frequency
HPC board	Name of PC board
IEC	International Electrotechnical Commission
IP	Industry partner
kdb	Knowledge database
Keyboard	Keyboard
LC	Light Control

Mat_No.	Material number (Siemens order number in SAP system - (previously called "Item Number")
Mh	Man hours
Mod	Modality
Modem	Modem
Mouse	Mouse
MPS	Multi Power Supply
OR	Operating room
PET	Product introduction team
PC	Personal Computer
PG	Planning Guide
PI	Pricing Information
PM	Project Manager
PS 12V	12V Power Supply
PSU	Power Supply Unit (main power supply in the electronics cabinet)
RS 232	RS 232 interface distributor (serial interface)
SH	Interface to building technology
SIOS	Siemens Integrated OR System
SIOS PC	SIOS Personal Computer
TFT	Thin Film Transistor
TM	Separation module
USV (**UPS)**	Uninterruptible Power Supply
VCR	Video recorder
VDE	Association for Electrical, Electronic and Information Technologies
VK	Short designation of system cable
VM / BM	Video mixer / image mixer
VP	Video printer
VR P FP	Internal department code
VS	Video Splitter
VR	Video Receiver
VX	Video Multiplexer
WS	Wall column, wall supply unit for Device Box and C-arm system
ZIP	ZIP drive (external)
ZS	Central control, lower section of cabinet

1.2 Definitions

Trades	Comprises all crafts and trades involved in completing a project
Worst case	Most unfavorable constellation or situation to be expected
Stand-alone operation	Manual operation of functional modules without SIOS control
IP	Industry partner; manufacturer of functional modules equipped with SIOS interface

This page intentionally left blank

2 General Information

2.1 Manufacturer's Information

- This document was originally created in German.
- Depending on the variant, there may be slight differences in images and drawings from the actual delivery status.

2.2 Time and Personnel Required

A trained technician will require 7 working hours to perform complete maintenance.

2.3 Maintenance Intervals

- Maintenance should be performed every 12 months.

2.4 Information Regarding Maintenance

- Damaged or worn parts should be replaced by original spare parts only.
- The customer support engineer (CSE) should complete and sign the maintenance protocol. Repairs and other work not listed in the chapter checklists should be listed separately under "Activities Performed".

2.5 Required Tools, Measurement Devices, and Auxiliary Materials

NOTICE	**All tools, measurement devices and auxiliary materials listed, except those marked with "*", are specified in the STC (Service Tools Catalog).**

- Standard tool kit*
- Digital multimeter (e.g., “Fluke 8060A”, material number 97 02 101)
- Protective conductor meter (e.g., “protective ground wire tester”, material number 44 15 899)
- "White" touch-up paint (e.g., touch-up applicator, material number 34 44 403)
- “Medium Basic” (Gray) touch-up paint (e.g., spray paint, material number 40 04 243)
- "Medical Blue" touch-up paint (e.g., touch-up applicator, material number 55 07 087)
- All-purpose grease (e.g., material number 34 91 271)
- A formatted 250 MB ZIP diskette
- A video cassette (VHS) in the correct format to test the video path*
- The system's backup diskette*

2.6 Required Documentation

Title	Document Print No.	Source
Installation Instructions	SPR1-130.812.11..	System binder
Installation Protocol	SPR1-130.813.11.	System binder
SIOS Circuit Diagram	SPR1-130.844.11	System binder
SIOS Operating Instructions	SPR1-130.620.11	Operating Instructions Binder, Customer
Service Manual	SPR1-130.898.11	Siemens Med
Maintenance Protocol	SPR1-130.832.11	Siemens Med
Ondal Operator Instructions for the Spacearm & Ondascope	Operator Instructions Space 150 58 24 /. Operator Instructions Scope _____	Operating Instructions Binder, Customer

The documents above are available in HTML format on the SIOS PC.

(select menu "Settings/Service/Activate service" + Password 1 / task card "System Part" - Service Documentation)

2.7 Spare parts that may be required

Component	Mat. No.	Remarks
Software Update	n.a.	Based on the current info at the time of the maintenance (yearly)
SIOS-PC, complete	56 49 624 J1049	Refurbished spare parts (3rd & 6th operating year in accordance with the EVOLVE contract)
UPS, complete APC	55 36 581 J1049	Refurbished spare part (every 3 years)
Battery for UPS, type: Smart-UPS 700VA 230V part no. : SU700INET	Replacement battery cassette RBC5	Alternative to refurbished REP - UPS Order directly from APC manufacturer*

* Internet : “www.apcc.com” to determine the local supplier. The return of old batteries is also described on this web site.

2.8 Clarification of symbols

Abbreviation	Meaning
SI	Safety inspection
SIE	Electrical safety
SIM	Mechanical safety
PM	Preventive maintenance
PMP	Periodic preventive maintenance
PMA	Maintenance, preventive adjustments
PMF	Preventive review of operating values and functions
Q	System quality, image quality
QIQ	Image quality
QSQ	System quality
SW	Software maintenance

Work steps marked with these symbols are check points in the maintenance protocol and are checked off accordingly.

NOTICE **Refer to the following pages for the complete inspection and maintenance sequence.**

2.9 Safety Information and Protective Measures

WARNING

Adhere to all safety information.

Non-compliance may result in death, physical injury, or property damage.

When performing all activities and tests, adhere to:

- **the product-specific safety information in the documentation**
- **Safety Notice TD00-000.860.01... ,**
- **the general safety information contained in ARTD Part 2.**

WARNING

High Voltage

Contact with parts under voltage may result in death or serious physical injury.

Prior to replacing assemblies, shut down the SIOS and switch off fuse F1 in the electronics cabinet.

2.10 Product-Specific Safety Measures

Hygiene and health-related requirements

⚠**WARNING**

Contamination of the entire OR environment with infectious substances!

Risk of personal infection or transfer of contaminated material to unsecured areas outside the OR.

Face masks are required inside the OR. In addition, all work has to be performed wearing disposable gloves.
Even minor injuries have to be treated and sterilized.
At a minimum, all objects removed from the OR area have to be wiped with a disinfectant.

Internal hygiene regulations apply when performing work in the OR area as well as handling tools and materials. These regulations have to be established and followed at all times.

Material brought into the OR

All required materials have to be transferred to the OR area in compliance with customer-specific hygiene guidelines. As a minimum requirement, the containers used (tool boxes and transport cases, boxes of materials, etc.) have to be cleaned with disinfectant prior to being transferred.

Cleaning

Cleaners for system components have to be approved for use inside the OR area.

All cleaning materials (cloths, brushes, etc.) may be used only once per system and have to be disposed of as non-sterile OR waste. If work is performed in the vicinity of an OR area currently in use, all personal and environmental safety requirements have to be observed.

This page intentionally left blank

System Overview

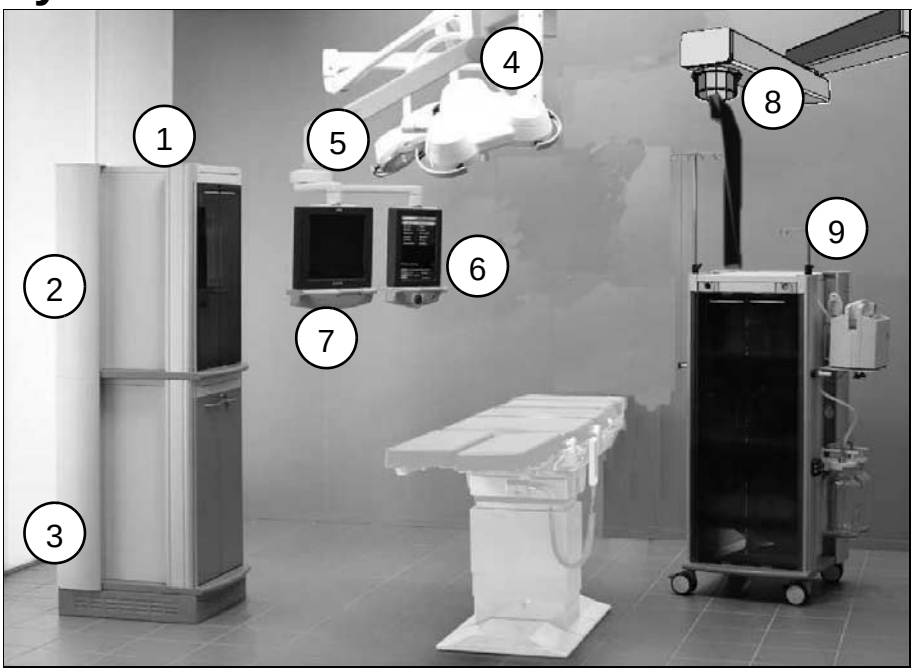

Fig. 1 System overview

Position	Abbrev.	Description
1	ES	Electronics cabinet
2	DE	Documentation unit - upper section of cabinet, incl. video components, mouse, and keyboard
3	ZS	Central control unit - lower section of cabinet, incl. SIOS_PC, integration modules, X-ray C-arm interface
4	DU	Ceiling support, display unit
5	MTS	Monitor support system
6	15" TFT	Menu monitor, operation
7	18" TFT	Image monitor
8	CL	Ceiling-mounted supply arm for device box
9	DB	Device box - accommodates surgical devices, media supply, ultrasound unit interface

SIOS functionality is achieved using integration and functional modules. This document covers the integration aspect only (SIOS delivery volume by Siemens). The functional aspects are provided by external vendors; related information should be obtained from the respective system documentation.

NOTICE

All functional modules provided by other vendors have to be available as specified in the OR equipment order before installation begins.

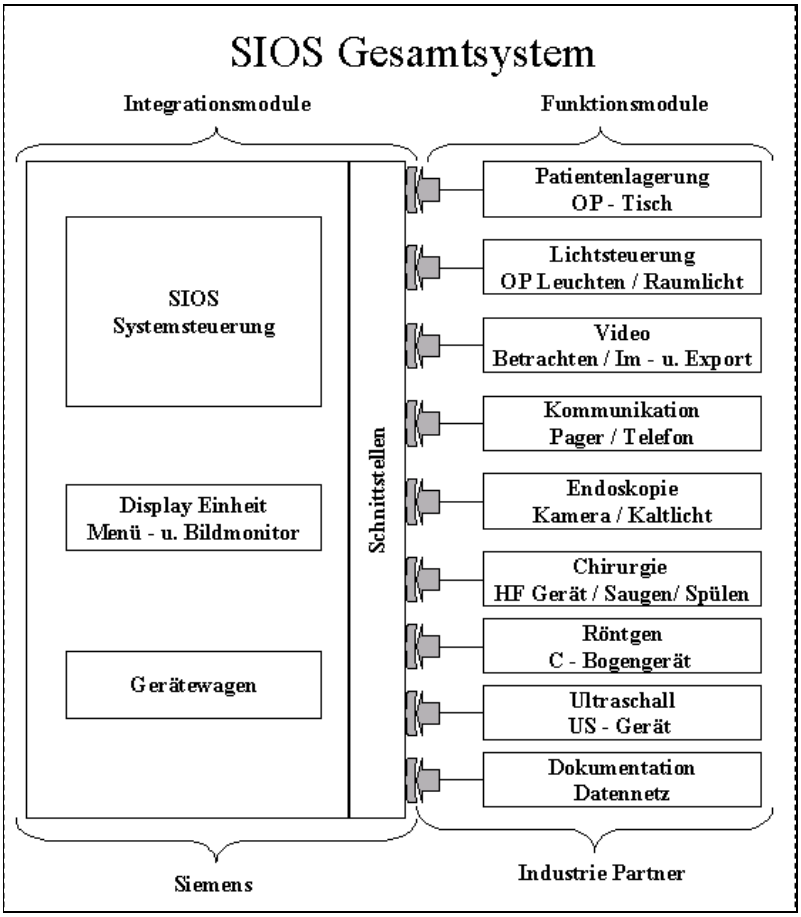

Fig. 2 Overall system

Integration modules		
Electronics cabinet incl. internal cabling	Speaker	Device box incl. internal cabling
SIOS power supply 230 V (PSU) and UPS	System cables VK 2 / VK 3 / VK 5.1	Headset and hand input device (HBT)
SIOS PC; mouse & keyboard; external ZIP drive	CAN branch 1	CAN branch 2 and 12 V power supply 2
RS 232 distributor		Separation module
CAI and modem		
Light control unit		Support arm 1 & MTS 1
MPS & 12 V power supply 1		Control monitor TFT 15”
Image mixer (video mixer)		Image monitor TFT 18”
Integration options		

Support arm 2 & MTS 2	2nd Control monitor TFT 15”	2nd Multi Power Supply
System cable VK5.2	2nd - 4th Image monitor TFT 18”	

Component positions inside the documentation unit

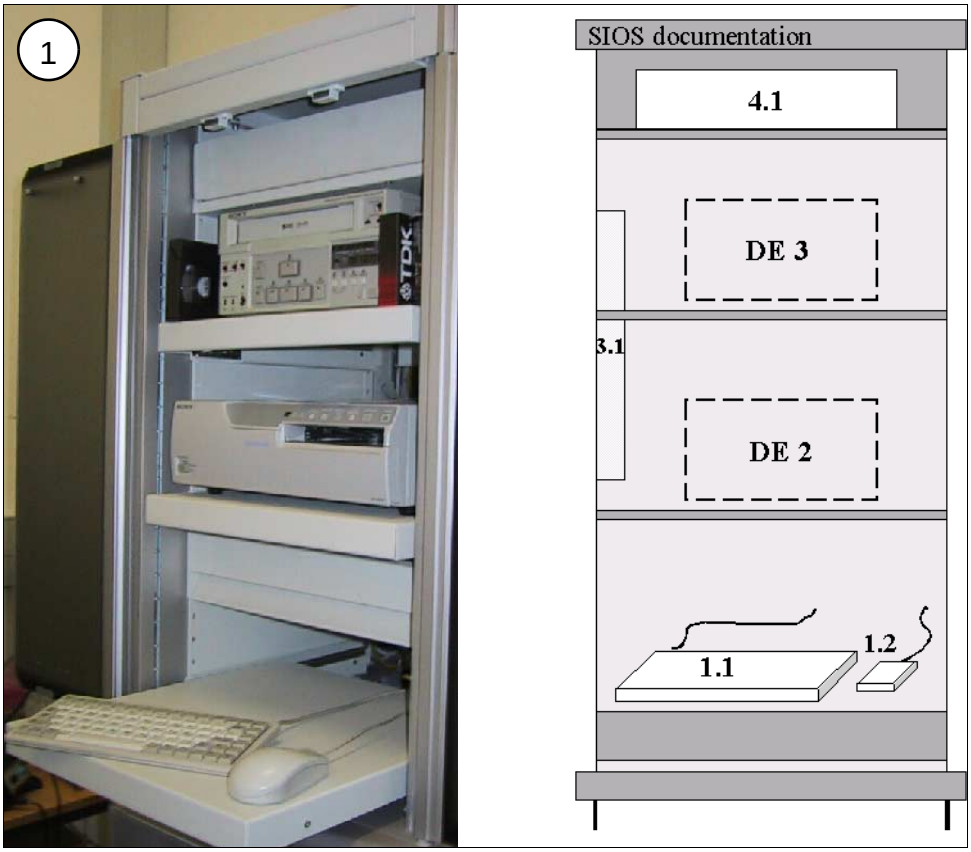

Fig. 3 Component positions inside the documentation unit

Position	Component
1	Cabinet, upper section
1.1	Keyboard
1.2	PC mouse
DE 2	Installation slot for documentation unit *1 (preferably video printer)
DE 3	Installation slot for documentation unit *1 (preferably video recorder)
3.1	ES 2 / multipoint connector 230V
4.1	Light control

*1 = components are provided by user (functional modules). If components are not available for installation, only the cables will be installed.

Component positions inside the central control unit

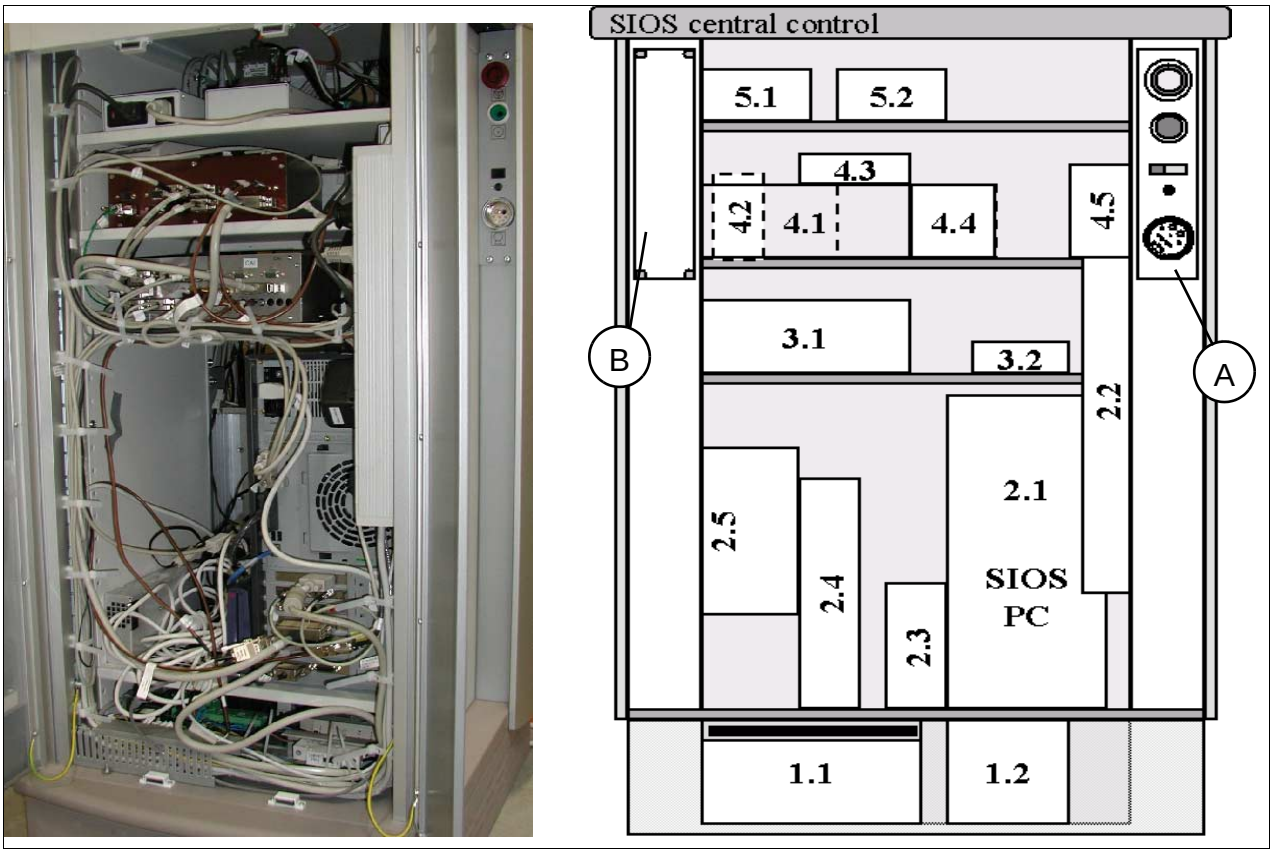

Fig. 4 Component positions inside the central control unit

Position	Component	Position	Component
A	On/off module, right-side installation	3.1	RS232 distributor
B	Bezel cover for on/off module, right or left	3.2	AAM audio amplifier
1.1	PSU / power supply 230V	4.1	CAI Audio Interface
1.2	UPS	4.2	PS 12V power supply
2.1	SIOS PC	4.3	Modem
2.2	ES1 / multipoint connector 230V	4.4	Video buffer amplifier
2.3	ZIP / external drive	4.5	VS 1/ video splitter, menu monitor
2.4	VM / image mixer	5.1	VX / video multiplexer, image monitor
2.5	MPS / Multi power supply	5.2	VR/ video receiver, image monitor

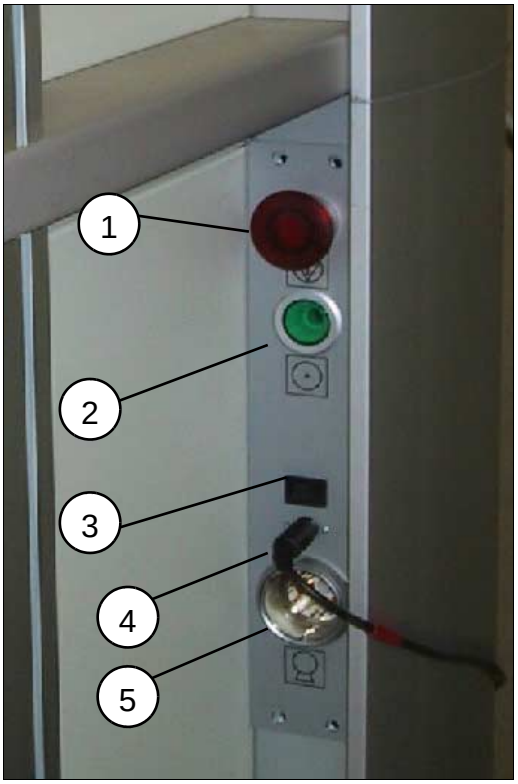

Fig. 5 On/off module inside the central control unit

Position	Component
1	EMERGENCY OFF switch
2	SIOS on/off switch
3	On/off video out
4	Video out interface
5	X-ray C-arm interface

SIOS PC connections

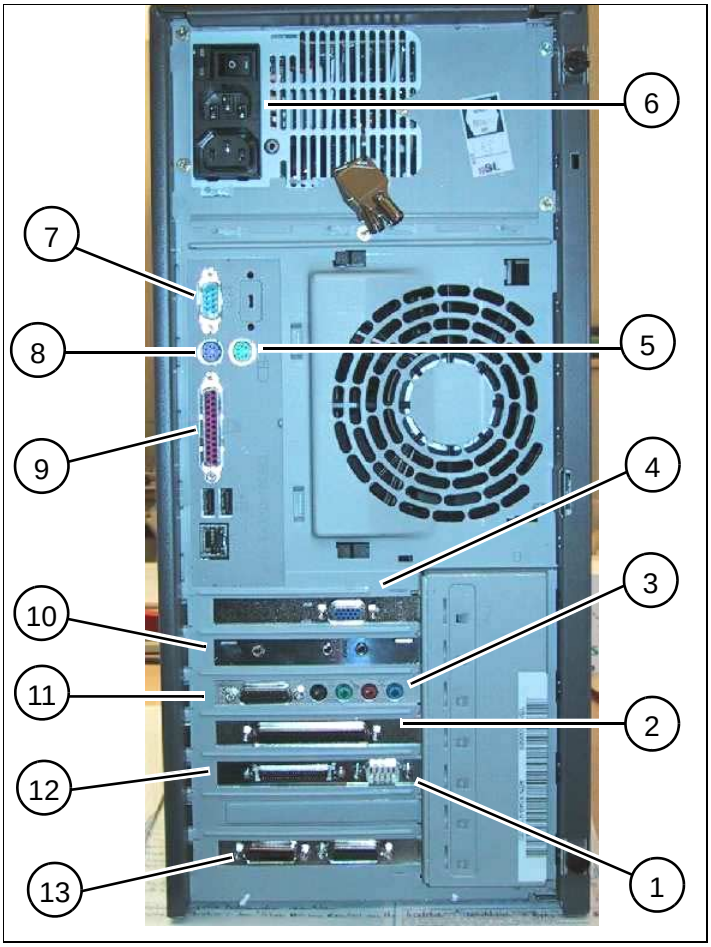

Fig. 6 PC connections

Pos.	Description	Pos.	Description
1	CANTRANS	8	Keyboard
2	Serial interface (Moxa board)	9	ZIP drive (external)
3	Speaker (HPC board)	10	Line in (HPC)
4	VGA Monitor	11	Line out
5	Mouse	12	Janz board
6	230 V line voltage	13	Sound (hand input device)
7	COM1/ Modem		

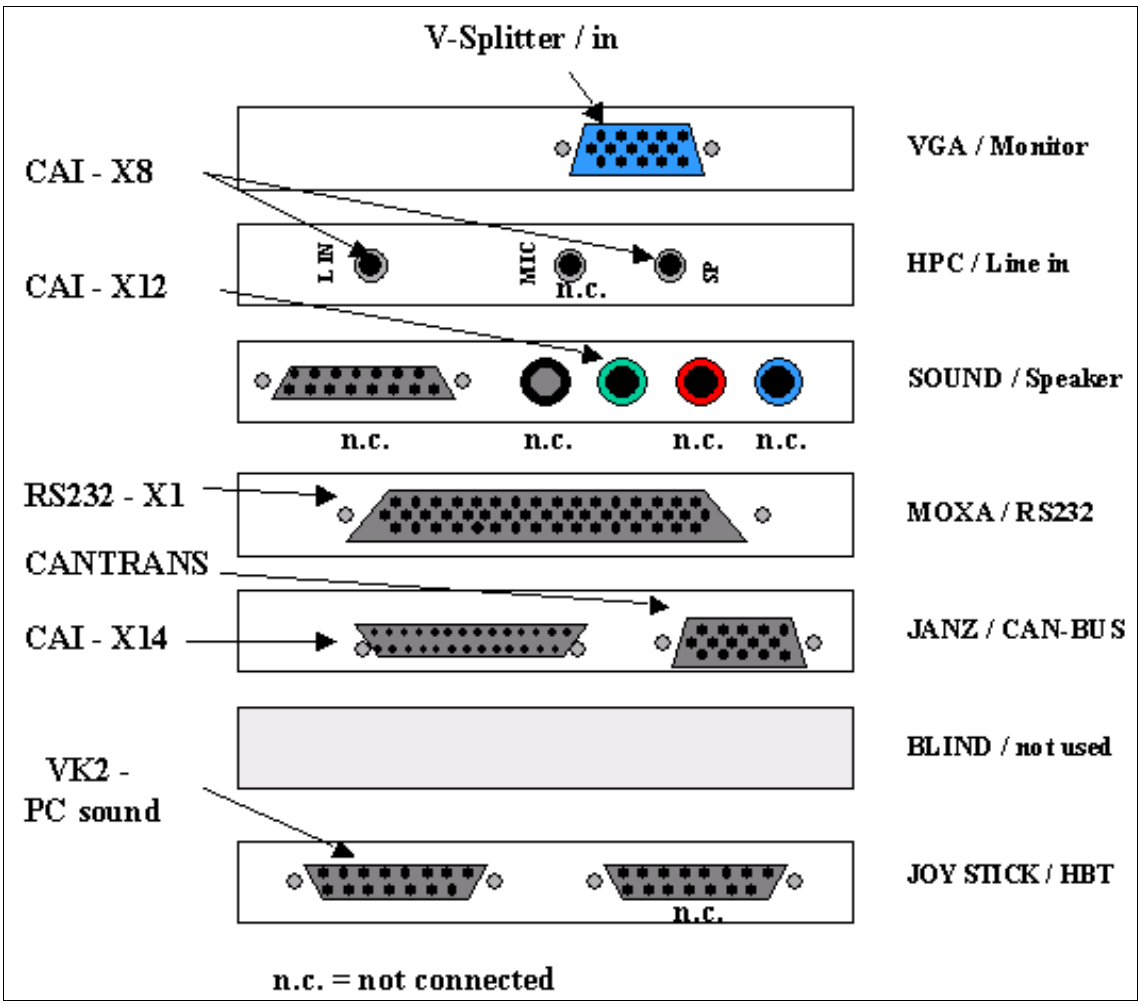

Fig. 7 PC connection - details

Component positions inside the device box

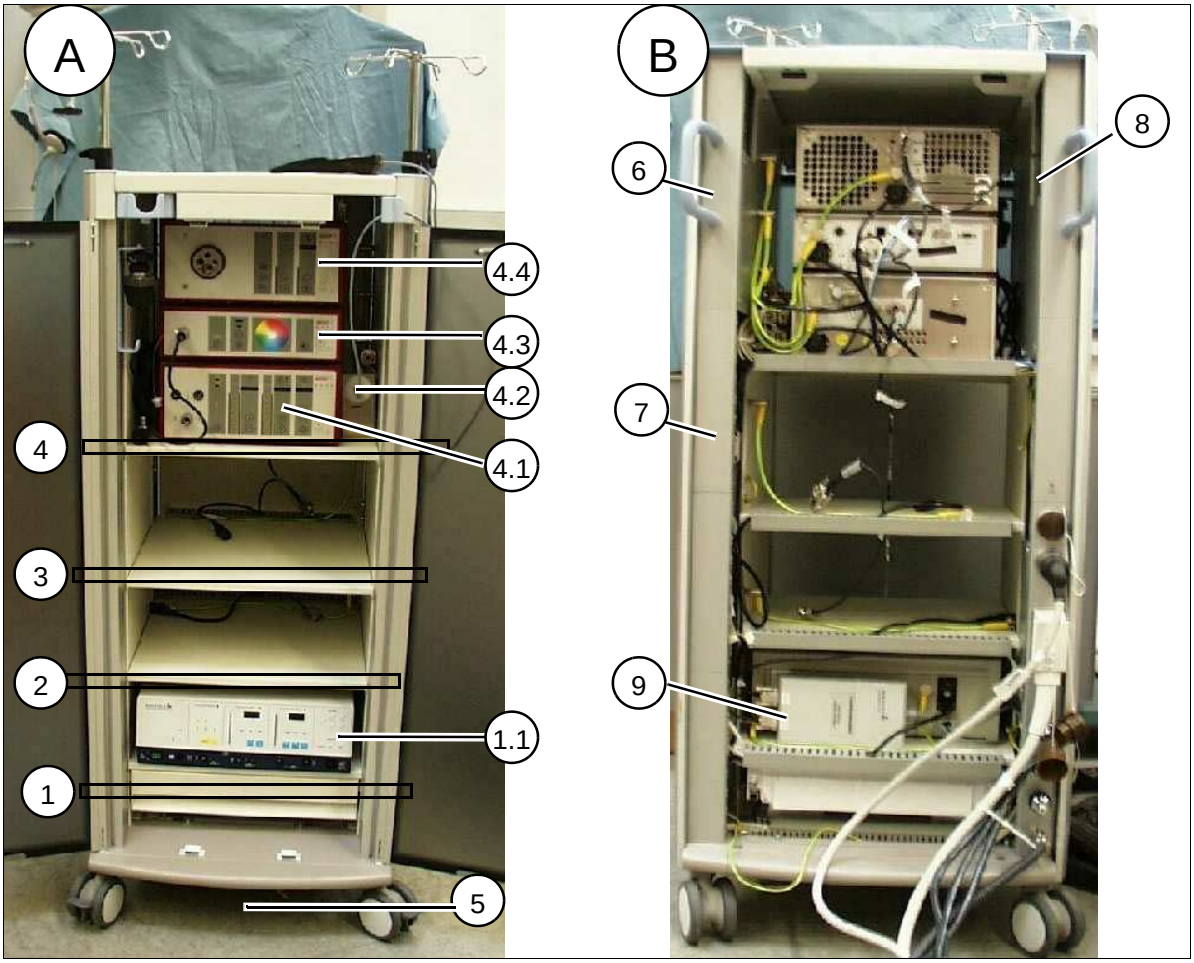

Fig. 8 Component positions inside the device box

Pos.	Description	Pos.	Description
A	DB, front view	4.2	Separation module for HBT
B	DB, rear view	4.3*	Endo camera
1	Lower mounting plate with drawer / Level 1	4.4*	Preferred location for cold light device (heat dissipation)
1.1*	Preferred location for RF device	5	IR booster (mounted below base plate, front transmit direction)
2	2nd Mounting plate / Level 2	6**	Power Supply 12 V
3	3rd Mounting plate / Level 3	7**	Multipoint connector 230 V
4	4th Mounting plate / Level 4 - preferred location for endo devices	8**	CAN branch
4.1*	Insufflator	9*	Preferred location for CAN adapter

* Not included in SIOS Siemens delivery volume / ** Installed in design profile

Device box - functional components

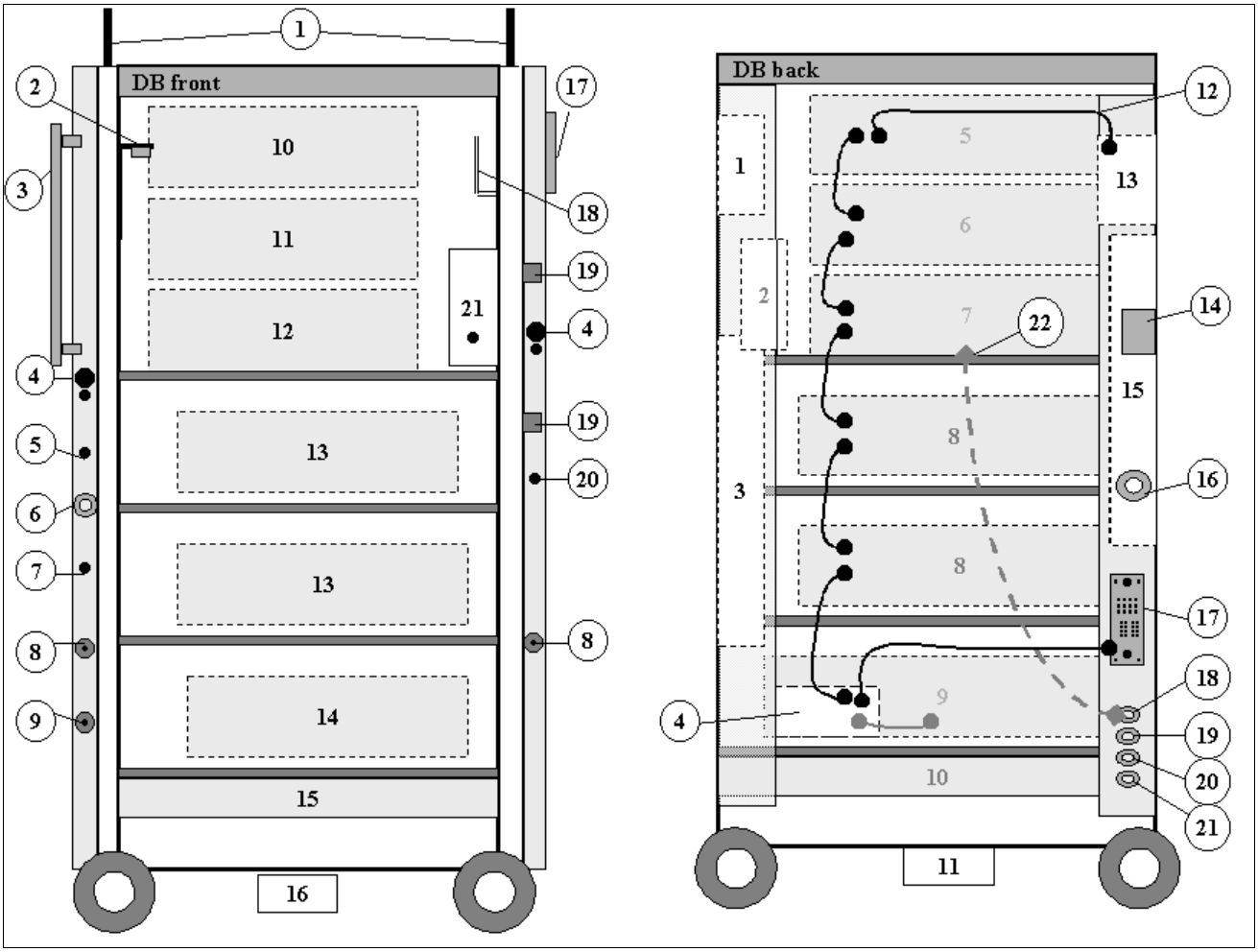

Fig. 9 Device box - functional components

DB Front	Description	Note
1	IV holder	One each on the front right and left side
2	Camera head holder	Mechanical park position for camera head
3	Perfusor holder	Anesthesia support
4	230V(110V)/150W	Line supply connection incl. circuit breaker
5	Headset connection	Connection for cable voice control
6	Video, ultrasound device	Image transmission from US device
7	Footswitch	n.c. (preparation for options)
8	Vacuum	Connection to sterile field

9	Air motor	Connection to sterile field
10	Endo cold light	Maximum heat build-up, therefore always top position
11	Endo camera	Proximity to endo light; control cable connection
12	Insufflation device	
13	Surgical equipment	Free space (e.g., rotary pump)
14	RF device	Source of RF interference, therefore always bottom position
15	Instrument drawer	Storage space for user
16	Infrared booster	OR table control; sub-flooring installation
17	HBT holder	Park position for non-sterile hand input device
18	Cable routing	Mechanical bracket
19	Standard rail	Accommodates devices (e.g., collection containers); right or left-side installation
20	CAN bus connection	Connection for SIOS-compatible devices (e.g., ultrasound)
21	Separation module	4kV separation; socket for hand input device

DB Back	**Description**	**Note**
1	Power supply 12V	Installed in design profile
2	Separation module	Back side, internal connections
3 & 15	Multipoint connector right / left	Power supply for surgical devices; installed in design profile
4	Adapter CAN-RS232	Provided by OEM
5 to 9	Back side of devices	see DB Front
10	Instrument drawer	n/a
11	Infrared booster	OR table control; sub-flooring installation
12	CAN cables	Serial from 17 to 13
13	CAN branch 2	Always CAN cable routing termination
14	Cable holder	Strain relief for VK1/VK3 from ceiling support arm
16	Video connector VK1	Video connection Endo to ES
17	System connector	Line voltage and signal connection to ES
18	CO2 in	Central supply for insufflation from VK3

19	Vacuum	Central supply from VK3
20	Compressed air in	Air motor in from VK3
21	Air motor out	Central exhaust from VK3
22	CO2 adapter	OEM-specific connection

Supply to device box

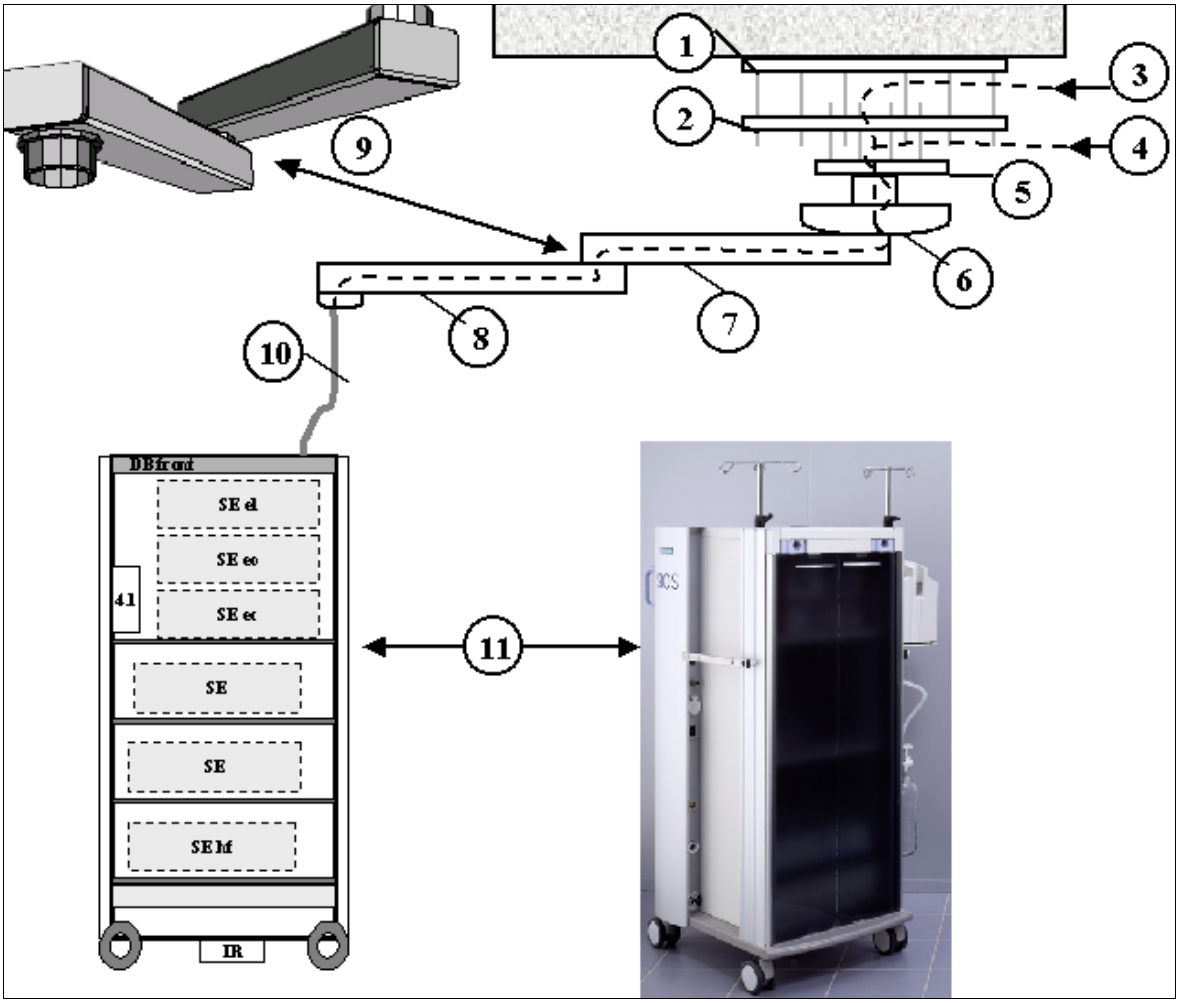

Fig. 10 Ceiling-mounted supply arm for device box

No.	Description	Note
1	Anchor plate	Unfinished ceiling installation
2	Interface plate	Alternatively single or tandem
3	Gas interface	On-site installation
4	System cable interface	VK 1 & VK3 to electronics cabinet
5	Flange	Ondascope support arm system

6	Single canopy	Does not apply for tandem connection
7	Cantilever arm 1	Length 800 or 1000
8	Cantilever arm 2	Length 800 or 1200
9	Dual cantilever arm	Diagram
10	Cables and gas hose	Supply lines to the device box
11	Device box	

Component positions in the monitor unit

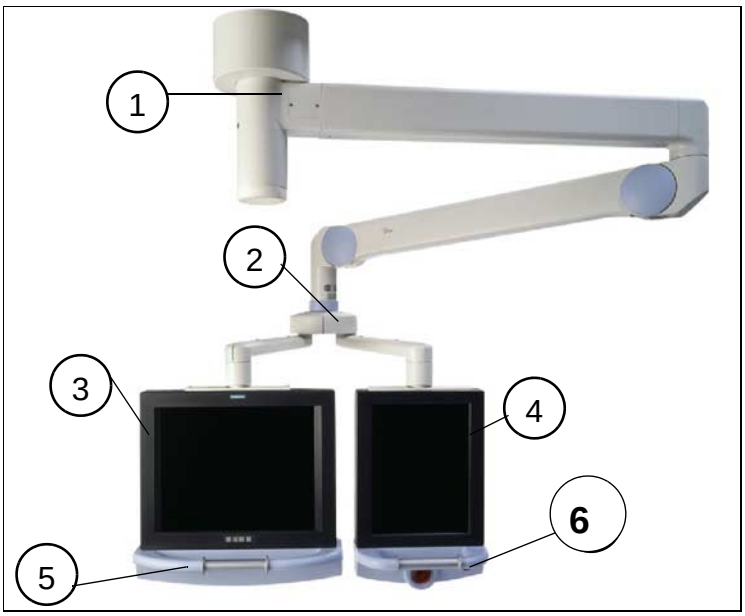

Fig. 11 Component positions in the monitor unit

Position	Description	
1	Support arm system	Onda Space
2	Monitor support system	
3	TFT Monitor 18"	
4	TFT Monitor 15"	
5	Grip module 18"	
6	Grip module 15"	Emergency Stop and Radiation On indicator

Hand input device (HBT)

Fig. 12 Hand input device

- Upper button (blue) for "Menu Back" function.
- Right and left buttons (yellow) for "Selection Menu Item" at menu monitor.
- Arrow buttons (white) for "Selection Menu" / up or down at menu monitor.
- Lower button (white) for "Start Printing" function (video printer - no menu display at monitor).

Keyboard

The dark-colored function keys are labeled with the same international symbols on all keyboards. The light-colored "Editor keys" are labeled in the respective national language.

Fig. 13 Keyboard

The language ID on the model plate is indicated by the two letters following the article no.

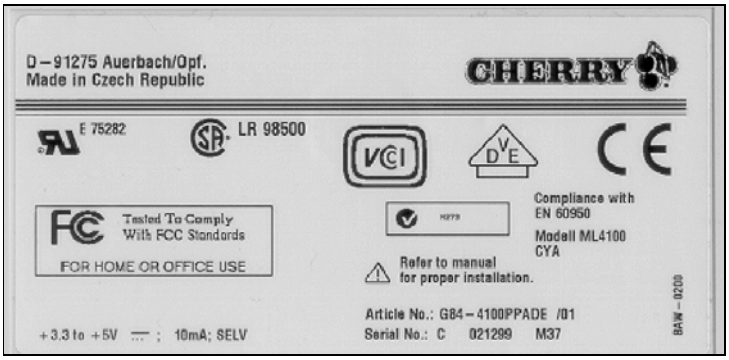

Fig. 14 Model plate (bottom side of keyboard)

Country ID		**Material no.**
Germany	DE	3080900
Switzerland	CH	3080926
United Kingdom	EN	3080942
Spain	ES	3080934
Italy	IT	3080959
Norway	NO	3080967
Finland	SF	3080975
Belgium	BE	3080918

Modem

Country-specific modems always include a power supply, phone cable, and PC interface cable.

Country ID		Material no.
Germany	DE	3076940
Austria	ÖST	3082732
Switzerland	CH	3082724
The Netherlands	NL	3082658
Luxembourg	LX	3082674
Belgium	BE	3082641
United Kingdom	GB	3076965
Sweden	SW	3082690
Norway	NOR	3082682
Spain	ES	3082666
Italy	IT	308270

This page intentionally left blank

4 Preliminary Steps

4.1 Preliminary Actions

NOTICE	**Preliminary actions must be fully clarified prior to performing maintenance in the OR room. Ambiguities may interfere with the work in adjacent OR rooms. This may lead to significant additional expenses related to transporting materials to/from the OR area.**

In addition to the CSE's tools, documents, measurement devices and resources, the following arrangements must be made with customer personnel:

- key for the electronics cabinet, the backup diskette, and the system binder.
- Photo paper and a color ribbon are required for the video printer option.
- For the pager and telephone test, inform each participant that the call is only a test.
- If mobile tables are being tested, ensure that at least two different tables are available for a defined period of time.
- If a stationary table is being tested, a carriage and tabletop must be available.
- An IP device must be available for each activated function module interface.
- A functioning camera head is required to test an endo camera.
- If an insufflator is being tested, ensure that sufficient CO_2 pressure is available.

This page intentionally left blank

5 SIOS System

PMF Function Test

Perform a full function test of the individual hardware and software configurations.

1. Switch off all IP devices.
2. Switch on SIOS.
3. Fully test the standard menus using the hand input device:
   OR lights; room lights; OR table; video mixer; video recorder; video printer.
4. Test the standard menus for the telephone and pager using the hand input device. Select one participant for each test.
5. Test the same menus exactly as described under steps 3 and 4 using the voice control.
6. Deactivate the "ClearKey" function via the "Settings/Service" menu.
7. Completely shut down SIOS via the "End" menu.
8. Switch on SIOS. During start up, take a screen shot of the current software version with key combination "Ctrl / PrtSc".
9. When start-up is complete, select the Paint program with key combination "Ctrl / Esc" and store the screen shot on the backup diskette in "Updates\Infos" under file name "Software_Version01.bmp" (if this file already exists, select a higher number instead of 01; e.g., Software_Version03.bmp).
10. Use key combination "Alt / Tab" to return to the SIOS main menu.
11. Switch on the IP devices in sequence, and wait for logon to each device.
12. Test all IP menus using the hand input device.
13. Test all IP menus using the voice control.

The voice control must be able to obtain a recognition rate of
min. 90 % in "any speaker" mode.
Simple test: For 10 different commands spoken in sequence, 9 must function correctly.

SW Software Update

This step should notbe performed if the PC will be replaced.

NOTICE

Updates serve to continually improve the system and maintain compatibility. Upgrades are always provided in special UPGRADE packages. New interfaces or options should never be activated as part of maintenance activities.

- This update is delivered with its own technical documentation or instructions, and should be performed as part of maintenance.
- Perform the update in accordance with the instructions, and confirm completion in the maintenance protocol.
- When the update is complete, take a screen shot of the start screen with the new software version (using key combination "Ctrl / PrtSc") during start up of the SIOS PC. Select the Paint program with key combination "Ctrl / Esc" and store the screen shot on the backup diskette in "Updates\Infos" under file name "Software_Version??.bmp"

Q PC Replacement

- Generally, a new PC should be installed within 3 to 6 years after initial system start-up. The exact timeframe depends on the type of PC maintenance contract.
- If a new PC is installed as part of maintenance, refer to the chapter "replacing the SIOS PC" in the Service manual (SPR1-130.898.11...). In this case, the annual software maintenance update is omitted.

6 Electronics Cabinet

PM Hygiene

- Visual Inspection for Cleanliness
  The climate control technology in the OR generally leaves behind a layer of microparticle dust in all sealed devices. Remove the dust from all fan systems.
  Remove any corrosion from exterior surfaces and repair any damage to paint.

SIM System Usage

- In the upper section of the electronics cabinet, check whether all components slide in and out of the shelves. The cable guides must be free of obstructions.
- Test the mouse and keyboard functions.

SIE UPS Replacement

- Replacement every three years is included in the REP procedure.
  Replace the UPS earlier if the remaining battery operating time < 4 minutes.
- Perform all work on the UPS in accordance with the original instructions. The documentation is located in the SIOS system binder.

Or refer to the Internet “www.apcc.com/products/UPS”. All required information may be found under device type “Smart-UPS 700”.

SIE UPS Test

The UPS must be able to maintain a minimum operating time of 80 seconds. When the battery pack is intact, the battery operating time will be at least 4 minutes. Check the UPS annually as part of maintenance.

- Switch SIOS on.
- Deactivate SIOS main fuse F1 in the electronics cabinet (simulates a power failure; the PC and menu monitor continue to operate).
- Activate fuse F1. The UPS produces a 3-tone signal approx. every 30 seconds.
- Check the UPS battery operating time (a wristwatch is sufficient for this test).
- Once 4 minutes have elapsed, switch on SIOS via the main switch.
- Restore standard operating mode.

This page intentionally left blank

7 Display Unit

SIM "Space Arm" Maintenance

Refer to the operating instructions from Ondal for the maintenance and service activities for the support arms. The documentation is located in the system binder and in the SIOS PC under "Service Documentation" (these are uncontrolled documents).

⚠CAUTION

Unintentional movement of the monitors when traveling to working positions.

Danger of collision with users or OR equipment.

Spring and brake force should be set only when all devices and covers are fully installed so that the full weight is taken into account.

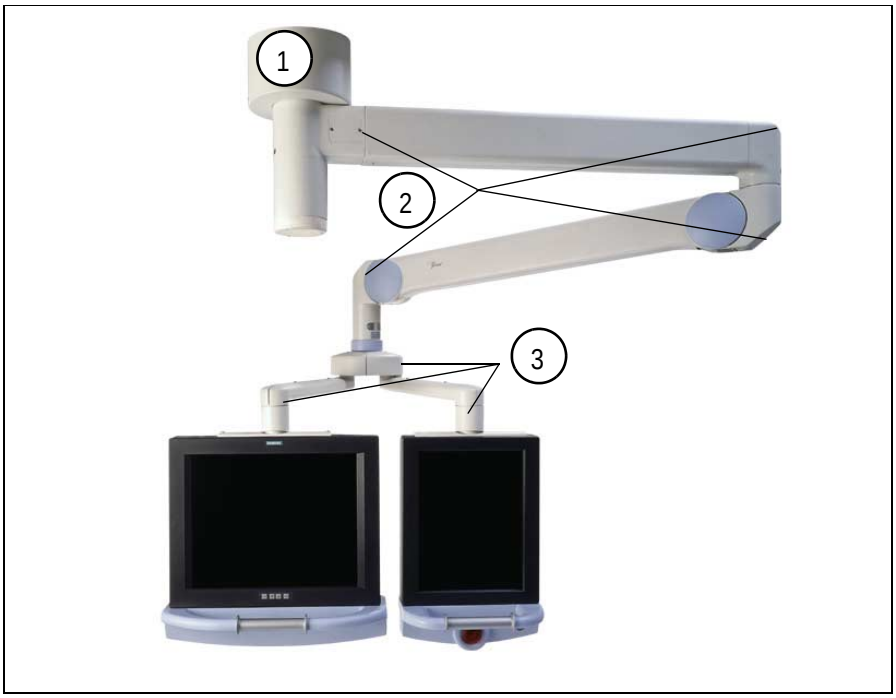

Fig. 1

SIE Inspecting the Support Arm Cables

Cable routing is described in the installation manual (SPR1-130.812.11...).

Inspect all cables at the arm joints to ensure they have not been damaged. Open the four installed covers (Fig. 1/2) and remove the rotating canopy (Fig. 1/1) and covers from the spring-loaded support arm.

Move the arm in all directions and ensure that the cables move without any strain.

SIM MTS: Stop Positions, Movement, and Brakes

- Check all rotating joints for the correct stop positions and limited movement. No measurement devices are required. All brakes and stop positions are visible when the covers are removed. Use standard tools to make any required corrections.
- **Stop positions:**
  The radii of movement are approximate values. The stop positions must explicitly work as intended (the degree values indicated are not checked).
- **Limited movement:**
  The part should not continue moving on its own once released, regardless of the position.

Schematic Top View: MTS

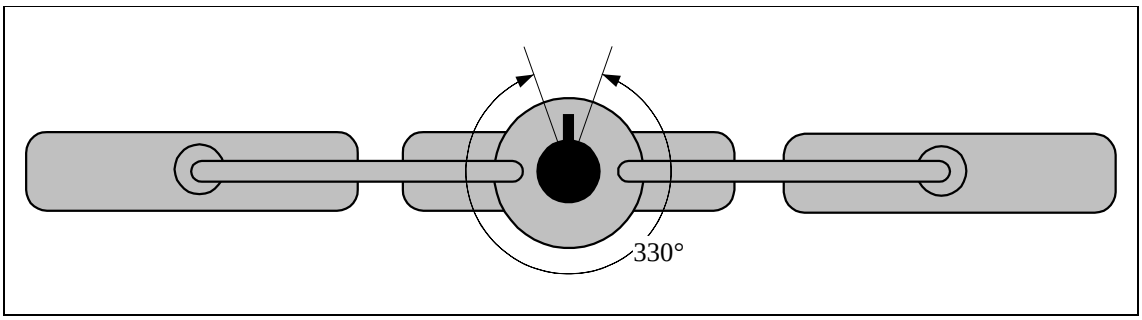

Fig. 2 Radius for the height adjustment of the support arm

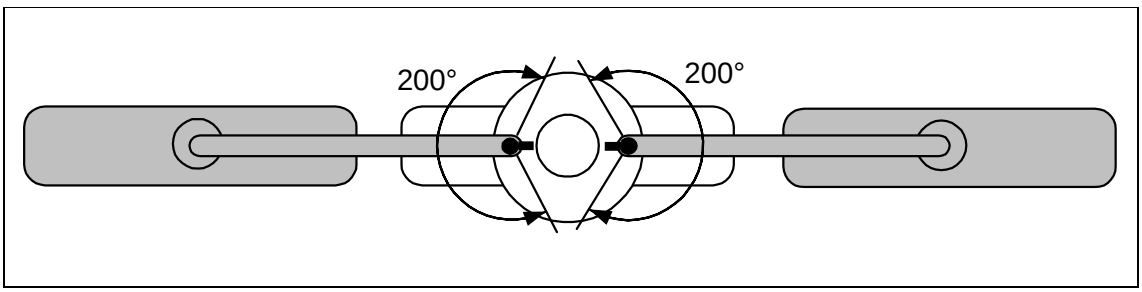

Fig. 3 Radii for the satellite arms

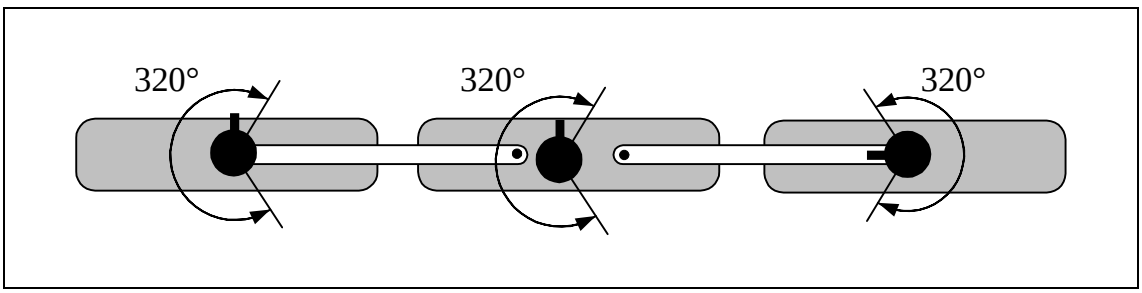

Fig. 4 Radii for the monitors

SIM User Position for the Monitors

- All monitors may be rotated up to 20° to a fixed position. When moved, the monitor must remain in the intended position.

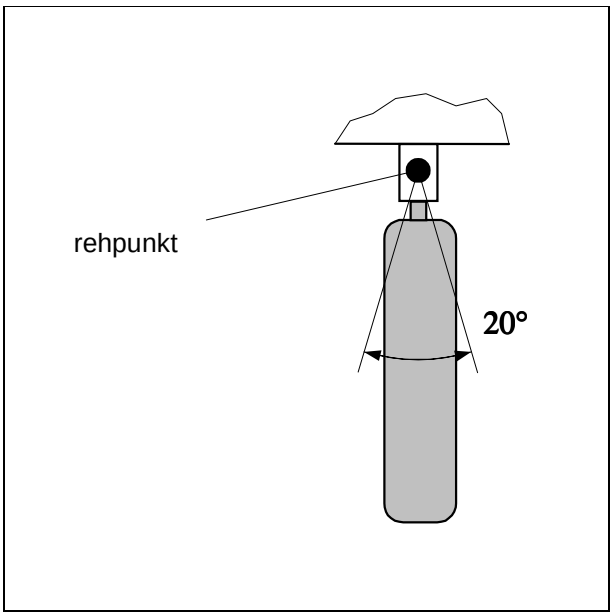

Fig. 5

SIE Checking the MTS Cables

Cable routing is described in the installation manual (SPR1-130.812.01...).

Inspect all cables at the joints to ensure they have not been damaged. Remove the covers.

Move the arm in all directions and ensure that the cables move without any strain.

QIQ TFT Monitor(s)

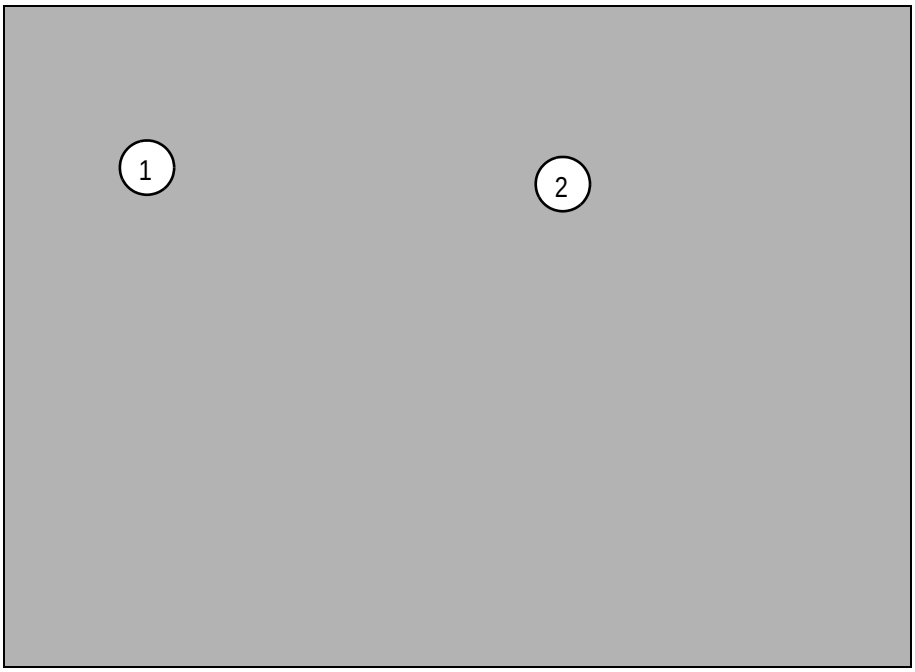

Fig. 6 Monitors

Image monitor (1/Fig.6)

The 18" TFT monitor(s) used with SIOS are not intended for diagnostic purposes and should be used solely for observation and to provide information. Do not perform a standard image quality test.

- Create a "blank screen" to check the screen for pixel failure (on/off switch at the rear of the monitor).
- Use the Config keys to determine the user settings. Test the brightness, contrast, back light, and color manipulation functions. When complete, restore the user settings.

Control or Menu Monitor (2/Fig.6)

The 15” TFT control monitor is used exclusively to display control information and equipment status. Do not perform a standard image quality test.

- Test the functions in the same manner as the image monitors.
- If monitors show signs of aging, discuss replacement with the customer.

8 Device Box

SI Hygiene

- Visual Inspection for Cleanliness
  The climate control technology in the OR generally generally leaves behind a layer of microparticle dust in all sealed devices. Remove the dust from all fan systems.
- Remove corrosion from painted surfaces and repair.
- Check the glass doors to ensure they are clean and move smoothly.
- Check the configuration of cable routing into the sterile area for correct functioning (camera cable, cold light cable, CO_2 hose, RF cable, suction and irrigation hoses, etc.).

SIM User-Guided Movements

- Check the travel and brake functions of the rollers.
- Test the possible travel range around the patient table.

SIM User Handling

- Check system cable VK1/3 for damage near the connectors.
  - bending radius, strain relief, cable movements within the travel range, disconnecting/ reconnecting the cables.
- Perform maintenance on the "Onda Scope" support arm system (cables to device box) according to manufacturer's instructions. The documentation is located in the system binder and in the SIOS PC under "Service Documentation" (these are uncontrolled documents).
- Check gas connections VK1/3 (back inlet) to ensure ease of coupling and decoupling.
- Check the gas connections (front side, hoses to patient) to ensure ease of coupling and decoupling.
- Check the CAN cables for damage; ensure they are intact.
- Check the device positions for proper thermal dissipation (endoscopy light source should always be in the top position). Vents should not be covered by foreign objects).
- Ensure that the standard rail, perfusion system holder, and I.V. holder are securely seated.

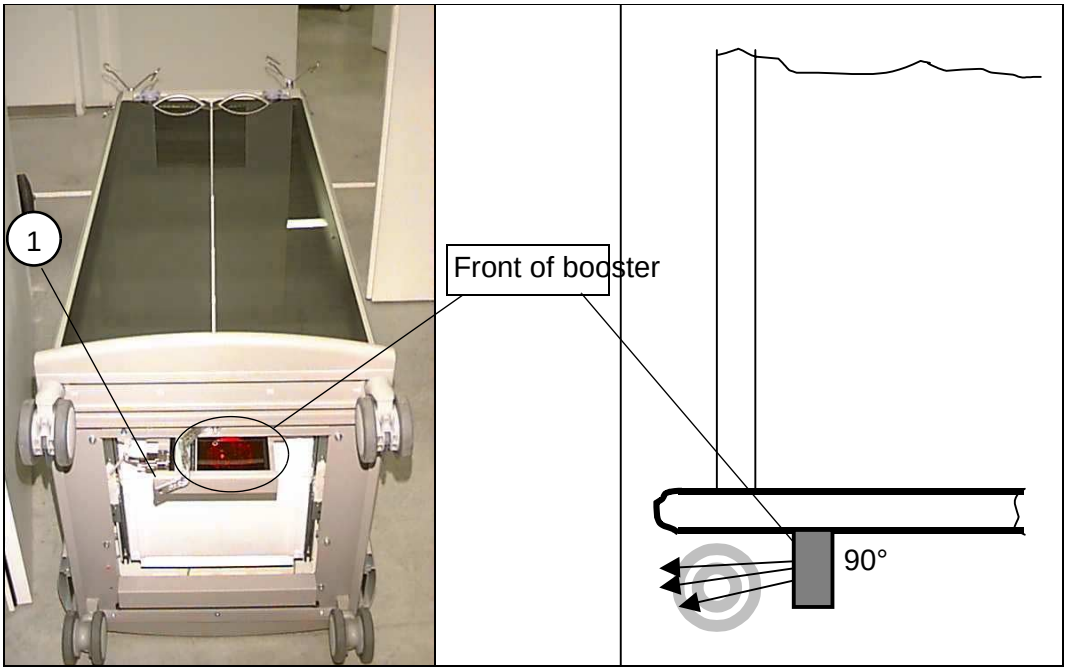

Fig. 1

Device box sub-base and schematic side view

SIE Infrared Booster

⚠WARNING

The IR booster transmits an invisible Class 3a laser beam.

Looking directly into the laser source could damage the eye.

Activate the Emergency Stop at the menu monitor. Do not use the IR booster for any actions during visual inspection.

Never look into the laser source at a distance of < 15 cm.

Never look into the laser source with optical instruments.

- Check the booster to ensure it is secure on the holding plate.
- It should be on the base plate at an angle of approx. 90° (Fig.1).
- The glass window should be clean and undamaged.
- Ensure that the input cable is secure.
- Ensure that the grounding strap is grounded correctly (1/Fig. 1).

9 Safety Tests

SIE Protective Conductor

- Perform a protective conductor measurement in accordance with ARTD -002.731.17...
- Use the following measurement points and compare to the central point in the electronics cabinet:
  - Sliding shelf in upper section of electronics cabinet.
  - Outer electronics cabinet cover and doors of lower section.
  - Outer covers of device box and adjustable shelves of surgical devices.
  - The screws of the support arm cover may extend up to 2 m above the floor.
  - MTS cover screws and monitor housing.

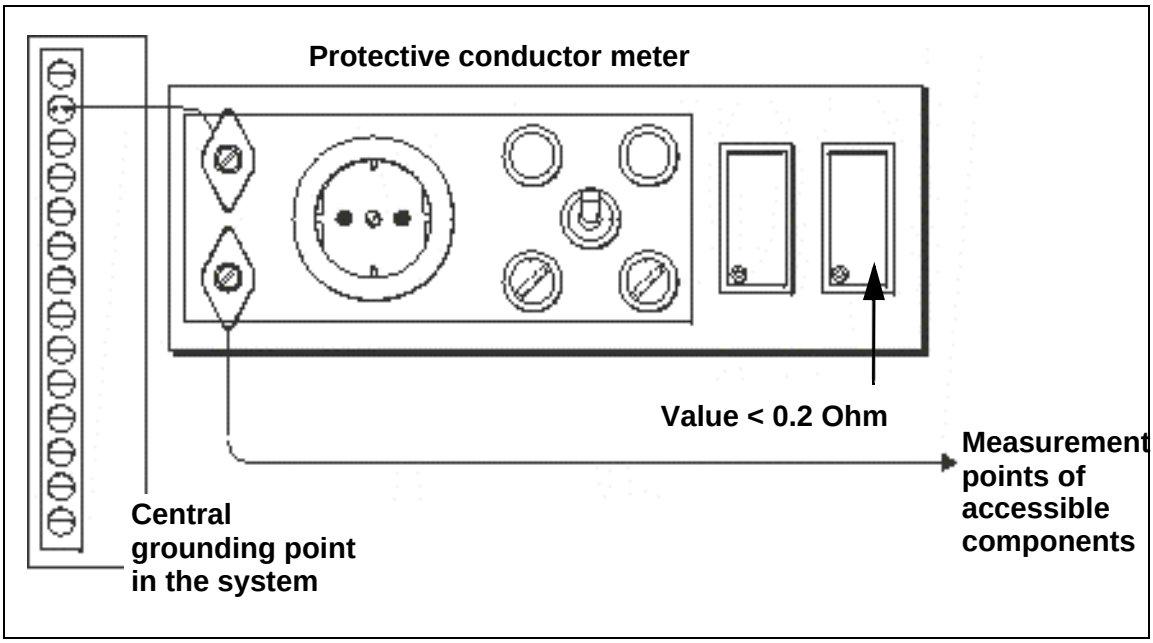
Protective conductor meter
Value < 0.2 Ohm
Measurement points of accessible components
Central grounding point in the system

Fig. 1

SIE Emergency Stop Test

- Press the Emergency Stop button at the grip module under the menu monitor (deactivates the infrared booster under the device box). Control the OR table via SIOS. The table should not respond, and an error message should display at the menu monitor.
- Use the manufacturer's controller to run the table. The table should operate correctly.
- Release the Emergency Stop, and wait for the start information at the menu monitor (takes approx. 30 seconds); the table should operate under SIOS control.

SIE Emergency Shutdown Test

- Press the Emergency Shutdown at the electronics cabinet. SIOS switches off almost every component. The image monitor, documentation unit, and surgical devices remain switched on.
  - Release the Emergency Shutdown.
  - Restart SIOS by pressing the green ON button.
  - Wait until start-up is complete.
  - In some cases, the control menu may not display properly.
  - In this case, shut down the PC in the regular manner using the "Exit" menu.
  - Wait until the shutdown is complete and then restart SIOS.
  - Normal operation will be possible once the start-up is complete.

10 Concluding Steps

SW Backup

- Update the system backup diskette if the hardware or software configuration is modified as part of maintenance. Proceed as indicated in the Service Manual SPR1-130.898.11...

QSQ Function Test

- If an update is performed as part of maintenance, test the system with the new parameters using the operating instructions.

QSQ Protocol

- Record all actions performed in the maintenance protocol (SPR1-130.832.11).

The protocol contains a page called "Activities Performed". Use this space to record all actions performed that are not specifically listed in the protocol.

For example: Adjusted the braking force at support arm 1.

This page intentionally left blank

11 Changes since the Previous Version

n.a.

This page intentionally left blank